

WSA Scientific Areas

Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
TOBACCO				
Biotechnology, GMO	Critical	Product Modification Effort	Evaluate technology for lowered biological activity, e.g. heavy metals, if no other technology will work	
	Critical	Research	Research better ways to test e.g. GET guidelines, Protein Transfer Study	
	Moderate	Monitor Literature	Evaluate literature	
Cadmium (deposition, uptake)	Moderate	Monitor Literature	Literature reviews	
Radioactivity	Moderate	Monitor Literature		
		Company Position		
Crop protection agents	Moderate	Other	Review use of CPAs from S&H perspective - tie into QA/Regulatory aspects. Work with leaf & QA	
Mycotoxins/Aflatoxins	Low	Monitor Literature	Can aflatoxins move into SS?	
	Low	Other	"Close the loop"	
Polonium	Low	Monitor Literature		
Breeding technologies for TSNA minimization	Low	Monitor Literature		
Processing technologies for TSNA minimization	Critical	Other		New Technologies/Product Dev/Leaf
a) Curing/handling				
Harmonization of MRL's for agrochemicals		Other	see CPAs	
Storage pest Control		Other	see CPAs	
Good Agricultural Practices	Moderate	Monitor Literature	Coordination with Leaf	

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
TOBACCO SMOKE (including ETS): <i>Health Endpoints</i>				
CANCER				
Lung Cancer				
a) Histological types	Critical	Other	Critical evaluation	
b) Analysis of current major databases	Critical	Other	Critical evaluation	
c) Additional factors		Monitor Literature		
		Research		
Mechanisms of lung cancer	Critical	Monitor Literature		
		Research		
		Company position		
		Other	Critical evaluation	
a) Genetic susceptibility	Critical	Monitor Literature		
		Company position		
		Other	Publication	
b) AH receptors	Critical	Other	Critical evaluation	
c) Adducts	Critical	Monitor Literature		
		Research - Likely to be done elsewhere		
		Company position	Included in Mechanism paper	
d) Cell cycle regulation genes	Critical	Monitor Literature		
		Research		
		Research - Likely to be done elsewhere		
e) Oxidative stress	Critical	Research		
		Product Modification Effort		
		Other	Critical evaluation	
Stomach Cancer	Low			
Liver Cancer	Low			
Laryngeal Cancer	Low			
Breast Cancer and Smoking	Moderate	Other	Critical evaluation; publication	
Cervical Cancer and Smoking	Low			
Pancreatic Cancer and Smoking	Low			
CARDIOVASCULAR EFFECTS				
Mechanisms	Critical	Other	Test model development; critical evaluation	
Buerger's disease		Monitor Literature	Develop understanding of disease, critical evaluation	
		Product Modification Effort	Guidance for product development (CO/Nicotine)	
Raynaud's disease				
Stroke	Moderate	Monitor Literature		
		Other	Test model development	

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
RESPIRATORY EFFECTS				
Asthma	Critical	Research - Likely to be done elsewhere		
		Company position		
Chronic Bronchitis	Moderate	Monitor Literature		
		Other	Test model development	
COPD	Critical	Other	Critical evaluation; test model development	
		Research - Likely to be done elsewhere		
SIDS - ETS Exposure/Maternal Smoking	Critical	Company position		
Tuberculosis	Low			
MECHANISM				
Endocrine disrupters	Low			
Adducts	Critical	Monitor Literature		
		Research		
		Other	Critical evaluation	
a) Mechanistic	Critical	Monitor Literature		
		Research		
b) Exposure monitoring	Critical	Monitor Literature		
		Research		
Biomarkers	Critical			
Cytotoxicity	Moderate	Research		
		Product Modification Effort		
COMBINATION EFFECTS				
Asbestos and smoking	Moderate	Other	Critical evaluation	
Radon and smoking	Moderate	Other	Critical evaluation	
Alcohol and smoking	Low			
Interactions among smoke constituents				
OTHER EFFECTS				
Body weight effects	Low			
Ocular	Moderate	Other	Critical evaluation	
Reproductive and Developmental Effects	Critical	Other	Test model development; critical evaluation	
Immunological effects	Moderate	Monitor Literature		
		Other	Test model development	
*Leucocytes	Low			
Life Expectancy	Moderate	Other	Critical evaluation	

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
TOBACCO SMOKE: <i>Smoke Constituents</i>				
NICOTINE				
"carcinogenicity"	Moderate	Monitor Literature		
		Company Position		
bioavailability (dose @ site of action)				
a) Uptake of nicotine vs. cigarette design	Critical	Other	Scientific Position	
		Company Position		
b) Dosimetry	Critical	Other	Scientific Position	External
c) Polymorphism of nicotine metabolism	Critical	Monitor Literature		External
		Research		
d) Peripheral nicotinic effects @ dose/target sites e.g. brain, cardiovascular, lung peripheral, bowel	Critical	Monitor Literature		External
e) Ammonia	Critical	Monitor Literature		
		Research		
		Company Position		
Metabolism	Moderate	Monitor Literature		
Smoking cessation (Nicotine delivery devices, patch, gum, etc.)	Moderate	Monitor Literature		
GENERAL SMOKE DELIVERY PARAMETERS				
total particulate matter	Low			
water	Low		—	
ALIPHATIC HYDROCARBONS				
1,3-butadiene	Critical	Monitor literature		
(reduction captured under "human carcinogens")		Research	Investigating smoking induced biokinetics	
isoprene	Moderate	Monitor Literature		
acetamide	Critical	Monitor Literature		
acrylonitrile	Critical	Monitor Literature		
1,1-dimethylhydrazine	Low			
hydrogen cyanide	Low	Monitor Literature		
2-nitropropane	Moderate	Monitor Literature		
urethane	Low			
HALOGEN COMPOUNDS				
vinyl chloride	Critical	Other	Scientific Position	
ALDEHYDES				
acetaldehyde	Critical	Other	Scientific Position	

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
formaldehyde		Research	if needed	
a) Product modification	Critical	Product modification effort		Product Development
b) Scientific evaluation	Low	Monitor literature		
acrolein	Critical	Product modification effort		Product Development
		Research		
propionaldehyde	Low			
MONOCYCLIC AROMATIC HYDROCARBONS				
benzene (human carcinogen)	Moderate	Monitor Literature		
toluene	Low			
styrene	Low			
POLYCYCLIC AROMATIC HYDROCARBONS	Critical	Monitor Literature		
		Product Modification effort		Product Development
benzo(a)pyrene	Critical	Monitor Literature		
(marker compound for other PAHs)		Research		
benz(a)anthracene	Low			
benzo(b)fluoranthene	Low			
benzo(i)fluoranthene	Low			
benzo(k)fluoranthene	Low			
dibenz(a,h)anthracene	Low			
dibenz(a,e)pyrene	Low			
dibenz(a,h)pyrene	Low			
dibenz(a,i)pyrene	Low			
dibenz(a,l)pyrene	Low			
indeno(1,2,3-cd)pyrene	Low			
5-methylchrysene	Low			
AROMATIC AMINES				
4-aminobiphenyl	Critical	Monitor literature		
		Research		
o-anisidine	Low			
2-naphthylamine	Critical	Monitor literature		
		Research		
o-toluidine	Low			
PHENOLS				
catechol	Low			
phenol	Low			
N-NITROSAMINES	Critical	Product Modification	Publish/Complete understanding	Product Development
a) TSNAs	Critical	Monitor Literature		
		Research		
		Product Modification effort		Product Development

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
		Other	Publication	
b) volatile nitrosamines	Moderate	Monitor Literature		
		Company Position		
nitrosodibutylamine	Low			
nitrosodictanolamine	Low			
nitrosodiethylamine	Low			
nitrosodimethylamine	Low			
nitrosodipropylamine	Low			
nitrosomethylethylamine	Low			
nitrosornornicotine	Low			
nitrosopiperidine	Low			
nitrosopyrrolidine	Low			
POLYCYCLIC AZA-ARENES	Low			
dibenz(a,h)acridine	Low			
dibenz(a,j)acridine	Low			
METALS				
arsenic	Critical	Monitor Literature		
		Research	Breeding and transfer studies	External
cadmium	Critical	Monitor Literature		
		Research	Breeding and transfer studies	External
chromium	Critical	Monitor Literature		
		Research	Breeding and transfer studies	External
lead	Critical	Other	Scientific Position	
selenium	Low	Monitor Literature		
nickel	Critical	Monitor literature		
		Research	Breeding and transfer studies	External
INORGANIC COMPOUNDS				
carbon monoxide	Critical	Monitor Literature		
		Product Modification effort		Product Development
		Other	Scientific Position	
nitric oxide	Moderate	Monitor Literature		
nitrogen dioxide	Low			
hydrazine	Low			
MISCELLANEOUS				
Radicals in smoke		Research		
	Critical	Other	Scientific Position	
Radioactivity in smoke	Low			
Dioxins	Low	Monitor Literature		
Thiol reactivity of smoke	Critical	Monitor Literature		
		Research		
Redox potential of smoke	Low	Monitor Literature		
		Research		

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
		Company Position		
Human carcinogens in smoke	Critical	Monitor Literature	Reductions in smoke	Product Development

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
TOBACCO SMOKE: ETS				
Carcinogenicity	Critical			
a) A/J mouse model - evaluation		Research	Determine if the A/J mouse model is truly appropriate as an assay for ETS	
b) plausibility/dose - response		Research	Continue to evaluate RASS/DEE study and extend appropriate endpoints to the A/J model	
Exhaled smoke	Low	Monitor Literature		
Ventilation and reduction technology	Critical			
a) Reduction assessment	Critical	Research	Assess effectiveness of novel technologies	
b) Reduction approaches	Critical	Other		CA, Engineering, WRA
c) Source reduction	Critical	Product Modification		RD&E
d) Test methodology	Critical	Research		
e) Establish quality criteria/quality control	Critical	Other	Provide assistance to Accommodation Program as needed	
Air-quality guidelines	Low	Monitor Literature		
ETS EXPOSURE ASSESSMENT				
ETS constituent markers	Low	Monitor Literature		
ETS constituent apportionment	Critical	Research	Develop meaningful data regarding ETS contribution to IAQ in various venues	External Research
ETS constituent modeling	Critical	Research	Develop optimum models and to be able to comment on published models	
Computational fluid dynamics	Critical	Research	Develop optimum models and to be able to comment on published models	
Children	Critical	Research	Have accurate data regarding exposure of children to ETS in the home	External Research
ETS AND ALLEGED HEALTH CONCERNs				
ETS and breast cancer	Critical	Other	Critically analyze published literature. To understand the potential role of ETS exposure to breast cancer	
ETS and adducts	Critical	Other	Critically analyze published literature. To assess the plausibility of the potential causal relationship between ETS exposure and lung cancer	
ETS and children's issues	Critical	Other	Critically analyze published literature. To evaluate the massive literature in this area	
ETS and CVD/Heart Disease	Critical	Research	Determine if any of the published literature in this field can provide any meaningful mechanistic information	
		Other	Critically analyze published literature	

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
ETS and lung cancer	Critical	Research	Determine the role that non-differential recall bias might be playing in observed dose-response trends. Dose/Response; Plausibility	External Research
		Other	Critically analyze published literature	

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
SMOKING BEHAVIOR/BASIC BIOLOGICAL ACTIVITY				
Total Exposure Characterization and Determinants	Critical			
		Research	Biomarkers	
		Product modification effort		
		Other	Work with regulators; evaluate literature	
UNDERSTANDING NICOTINE'S ROLE AS A SMOKING DETERMINANT	Critical	Monitor literature		
		Research		
		Other	Work with external scientists	
Mechanisms	Critical	Monitor literature		
		Research		
a) Neurodegenerative disorders		Monitor literature		External
		Research		
b) Alzheimer's disease		Monitor literature		External
		Research		
c) Tourette's Syndrome		Monitor literature		External
		Research		
d) Parkinson's disease		Monitor literature		External
		Research		
e) Cognition, learning and memory		Monitor literature		External
		Research		
f) Clinical depression and schizophrenia		Monitor literature		External
		Research		
g) Stress, mood and depression		Monitor literature		External
		Research		
h) Neurotransmitters and nicotine receptors		Monitor literature		
		Research		
i) Combined effect of ethanol and nicotine		Product modification effort		
		Monitor literature		

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
PRODUCT EVALUATION				
INGREDIENTS EVALUATION				
General Justification	Moderate			
- Reviews (white papers)	Moderate	Other	Monographs	
- Approval of WW packaging materials	Moderate	Other	PI Evaluations	
- Ingredient transfer study	Critical	Research	Publish	
- Ingredient Testing Program	Critical	Research	Publish	
- Humectants	Moderate	Other	PI evaluations	
Evaluation of defoamers	Moderate	Other	PI evaluations	
Evaluation of plug wraps	Moderate	Other	PI evaluations	
Evaluation of flavors	Critical	Other	PI evaluations	
Evaluation of sideseam adhesives	Critical	Other	PI evaluations	
Inks	Moderate	Other	PI evaluations	
INGREDIENT TESTING				
Independent Scientific Review Committee for Ingredients	Critical	Other	Set up committee	
Inhalation study to evaluate sideseam adhesives	Moderate	Research		
INDIRECT MATERIALS				
Steam chemicals	Critical	Research		
		Other	PI evaluations	
Lubricants	Moderate	Research		
		Other	PI evaluations	
Polymer pyrolysis study	Moderate	Research		
Processing aides (documented evaluation)	Moderate	Other	PI evaluations	
MES analyticals (indirect materials evaluation program)	Moderate	Research		
Reclassify N-rated materials (use until substitute is found)	Moderate	Other	PI evaluations	
Direct contact hoses	Moderate	Other	PI evaluations	
Latex allergy	Moderate	Other	Critical literature review	
Cobalt risk assessment	Moderate	Other	Write risk assessment	
MISCELLANEOUS				
Guidance for development of lower biological activity in the product	Critical	Other	Communication with development	
Selective filtration	Critical	Other	Communication with development	
Tobacco burn characteristics (parameter study)	Critical	Research		
Cocoa	Moderate	Research		
		Other	Critical Review of literature	

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
Vinyl acetate in smoke	Critical	Research		
Propylene oxide in smoke	Critical	Research		
Menthol	Moderate	Other	Monograph	
- Design study to test menthol		Research		
Pubs/presentation	Critical	Other	Write publications	
Scientific Dialogue	Critical	Other	Communication with outside scientists	
Symposium	Critical			
Chemistry list weighting approach	Critical	Research		
		Other	Critical review of literature; publish	
Inhaled fibers	Low	Monitor Literature		
Pipe, RYO, Cigarillo, & Cigar product testing strategy	Low	Monitor Literature		
		Research		
		Company Position		

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
METHODOLOGY				
ASSAYS				
Product Integrity Testing				
- In Vitro				
- New Ames strains	Low			
- TK assay	Low			
- Cytotoxicity	Critical	Research		
- In Vivo	Moderate	Monitor Literature		
- Micronucleus	Low			
- Hormones in inhalation study	Moderate	Monitor Literature		
		Research		
- Optimize inhalation study design	Low	Other	Publication	
- Evaluation of skin painting	Low	Company Position		
- Smoke Analysis				
- Maintain state-of-the-art smoke chemistry list	Critical	Monitor Literature		
- Develop validated methods for smoke chemistry list	Moderate	Monitor Literature		
		Research		
- Testing method for "pH" in smoke	Low	Monitor Literature		
		Research		
		Company Position		
		Other	SAB	
- Redox potential	Low	Monitor Literature		
		Research		
		Company Position		
		Other	SAB	
- Machine smoking regimens (puff profiles)	Critical	Research		
		Company Position		
		Other	Review literature	
- Determine if routine sidestream smoke analysis is necessary	Moderate			
- Modelling and understanding of cigarette parameters	Critical	Research		
		Other	Publication	
Research				
- In Vitro				
- Tumor promotion - epigenetic carcinogenesis	Critical	Monitor Literature		
		Research		

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
- In Vivo (models, mechanisms)				
- Carcinogenicity	Critical	Monitor Literature		
A/J mouse	Critical	Monitor Literature		
		Research		
Genotoxicity	Critical	Monitor Literature		
		Research		
Cell proliferation	Critical	Monitor Literature		
		Research		
- Non-neoplastic lung diseases		Monitor Literature		
COPD	Critical	Monitor Literature		
Emphysema	Critical	Monitor Literature		
Immunotoxicity	Critical	Monitor Literature		
		Research		
- CVD	Critical	Monitor Literature		
- Reproductive toxicity	Moderate	Monitor Literature		
		Research		
OTHER METHODOLOGICAL ASPECTS				
Epidemiological Practices	Critical	Monitor Literature		
		Research		
Causation methodology	Critical	Other	Evaluate literature; scientific position	
Exposure monitoring methodologies	Moderate	Monitor Literature		
		Research		

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Areas of Focus	Priority	Type of Work	Type of Work	Executed by:
EMERGING ISSUES				
Cancer vaccines	Moderate	Monitor literature		
History of PM S&H research in context	Moderate	Research		
		Product Modification Effort		
		Other	Develop mechanism (i.e., internal website to share info)	
Research in the Public Interest				
Publications	Critical			
Scientific Dialog	Critical			
- scientific education, e.g. SOT				
Degenerative diseases		Monitor literature		
		Research		
		Other		
Nicotine Vaccine	Low	Monitor literature		
Smoking Cessation - Devices	Low	Monitor literature	scientific and pharmaceutical publications	

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